

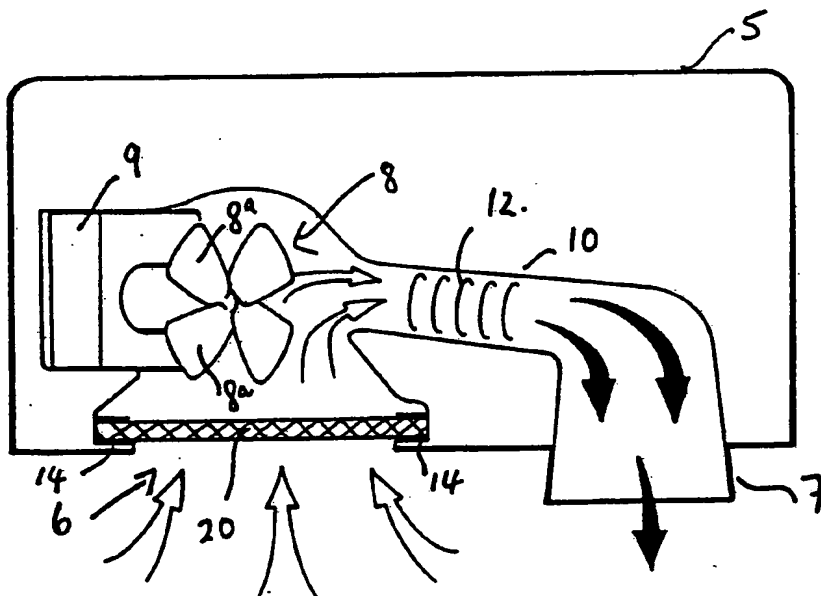
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<p>(21) International Application Number: PCT/AU89/00320</p> <p>(22) International Filing Date: 31 July 1989 (31.07.89)</p> <p>(30) Priority data: PI 9581 29 July 1988 (29.07.88) AU</p> <p>(71) Applicant (for all designated States except US): INTERNATIONAL DRYER COMPANY PTY LTD [AU/AU]; 319 McCarrs Creek Road, Terrey Hills, NSW 2084 (AU).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): ELLISON, Allyn [AU/AU]; 319 McCarrs Creek Road, Terrey Hills, NSW 2084 (AU).</p> <p>(74) Agent: HODGKINSON, Hugh, Rudyard; H.R. Hodgkinson & Co., 26A Alfred Street, Milsons Point, NSW 2061 (US).</p>		<p>(81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), SE (European patent), SU, US.</p> <p>Published With international search report.</p> <p>BEST AVAILABLE COPY</p>

(54) Title: HOT AIR DRYER



(57) Abstract

A hot air dryer used for drying various parts of the body, comprising a housing formed from a mouldable material, such as a vitreous earthenware material, is adapted to provide promotional communication, by means of the shape of the housing or visual displays thereon, or audible messages therefrom. A filter is included within the hot air dryer to filter ambient air passing into said housing.

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HOT AIR DRYER**TECHNICAL FIELD**

THIS INVENTION relates to hot air dryers and more particularly to a hot air dryer of much-improved construction.

BACKGROUND ART

It is well known to provide hot air dryers for supplying hot air or drying various parts of the body. For example hot air dryers are often used for drying hair, or in wash-rooms or rest rooms for drying hands. Essentially the hot air dryers known up until this time comprise a housing with an air inlet and an air outlet, a fan or suction device being provided within the housing. Appropriate actuating means allow for the arrangement to be turned on so that air is drawn into the housing, heated by appropriate heating means and thereafter forced out through the outlet, so that the hot air is able to be used to dry hands, hair or the like. In some known forms of hand dryer, infra-red actuating means are provided so that the arrangement is actuated upon the hand or body passing through the beam of the infra-red actuating means.

The hot air dryers known up until this time have generally been manufactured from a metal material such as a coated metal material. This has meant that they are relatively expensive and time-consuming to manufacture.

Further, the dryers used up until this time have not been as efficient as might be desired, given that the fans within the housings draw dirt and extraneous matter such as hair and the like into the housing, this extraneous matter becoming coated on the blades of the fan. Apart from the fact that this is particularly unhygienic, the extraneous matter coated on the blades of the fan, cause the fan to operate at less than satisfactory levels of performance, as a result of which hot air that has been heated within the housing and is to be

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blown out of the housing by the fan is not distributed in a satisfactory manner. Further, in many known forms of dryer heating means are provided between the fan and the outlet, so that where extraneous matter is drawn into the housing by the fan, or coated on to the fan, there is always a risk that such extraneous matter will come into contact with the heating means, thereby bringing about the risk of fire.

It is an object of this invention to go some way towards overcoming at least some of these disadvantages or to at least minimise such disadvantages.

Other objects of the invention will become apparent from the following description.

DISCLOSURE OF THE INVENTION

According to one aspect of the invention there is provided a hot air dryer comprising a housing formed from a mouldable material and having an air inlet and an air outlet; means within said housing to draw ambient air into the said housing and thereafter direct said air towards said outlet; heating means within said housing to heat air as it passes to said outlet so that heated air issues from the said outlet; and means to actuate the said means for drawing air into and through said housing, wherein said mouldable material is a ceramic earthenware material.

According to a further aspect of the invention there is provided a hot air dryer comprising a housing formed from a mouldable material and having an air inlet and an air outlet; means within said housing to draw ambient air into the said housing and thereafter direct said air towards said outlet; heating means within said housing to heat air as it passes to said outlet so that heated air issues from the said outlet; means to actuate the said means for drawing air into and through said housing; and filter means disposed adjacent said

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air inlet and inwardly thereof so as to filter ambient air passing into said housing.

According to a further aspect of the invention there is provided a hot air dryer comprising promotional means, said promotional means including visual and available messages.

BRIEF DESCRIPTION OF DRAWINGS

The invention will now be described by way of example only and with reference to the accompanying drawings, wherein:

IN THE DRAWINGS

FIGURE 1 is a diagrammatic view of an example of an air dryer according to one form of the present invention;

FIGURE 2 is a diagrammatic sectional view of an air dryer according to one form of the present invention.

The present invention will be described by way of example only, with reference to a hot air dryer as may be used for example for drying hair or hands. It should be appreciated however that the invention has equal application to all other forms of hot air dryers that may be used for other purposes.

As referred to hereinbefore, hot air dryers known and used up until this time have usually been formed of a metal or plastics material, the metal usually being coated with an appropriate coating. It has been recognised that there are substantial uses for hot air dryers in washrooms associated for example with restaurants, service stations, petrol stations and the like. It is therefore recognised that there is a substantial advantage and marketing development, in providing hot air dryers which are in the form of or shaped as logos, trade marks devices or the like associated for example with the restaurant or service station concerned. For example, it

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is believed that there is a substantial advantage in providing hot air dryers in the rest room of a hamburger restaurant, wherein the dryers are shaped in the form of, say, a hamburger. Alternatively, for example in the rest room of a service station or petrol station, the hot air dryer might be formed in the shape of a logo or trade mark of that particular company. It is further considered that there are substantial advantages to be gained from forming hot air dryers of novel and distinctive shapes and configurations, such as might be found in children's playgrounds, children's bathrooms or the like. These are by way of example.

Other examples of promotional means, which may be incorporated into the design of a hot air dryer, include; transfers, monograms, printed labels, LED or crystal displays, a spoken message, or even cards such as menus and the like.

It is recognised in the invention that often the demand may be small for a particular shape or configuration of air dryer. One of the problems with meeting such a demand is that it is particularly time-consuming and expensive to form or mould housings for hot air dryers from the materials presently used insofar as hot air dryers are concerned. For example, although such housings could be formed of a mouldable plastics material, there would be substantial expense in preparing and using moulds and dies. Likewise, although possible, there would be substantial expense in fabricating housings of distinctive shapes from metal material.

Thus, following substantial investigation and experimentation, it has been found that a particularly appropriate type of material for moulding housings of distinctive shapes and the like in short run low number production are vitreous earthenware materials such materials being able to be moulded and formed into a housing of a desired shape and appearance,

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in a straightforward and efficient mould, in relatively short periods of time and without substantial expenditure insofar as moulds are concerned. Thus, it has been found that by moulding housings for hot air dryers, from vitreous earthenware material, the problems associated with known materials are overcome or substantially minimised.

It has therefore been found that by using the vitreous earthenware material, or other materials suitable for low quantity moulding such as imitation marble (corian), housings can be formed and moulded into particular or desired shapes, such as for example the shape of a hamburger for use in a hamburger restaurant, as shown in Figure 1 of the drawings. Such housings are moulded having inlet and outlet means and appropriate actuating means if desired. As indicated, certain hot air dryers can be provided with automatic or infra-red actuating means.

It is envisaged that vitreous earthenware materials could for example be ceramic, porcelain, china, pottery or other earthenware materials. These are by way of example only. It is further envisaged that new mouldable materials will be developed in the future, such as various fibre-glass reinforced plastics and composites combining earthenware and polymeric materials, that may be used to form the housing.

As indicated hereinbefore, it has been found that hot air dryers used up until this time have not always operated as efficiently as might be expected. It has been found that one of the main reasons for this is that the dryers which incorporate fans to pull air into the housing to be there after heated and forced out of the housing, are often coated with dirt and extraneous matter which is drawn in through the air inlet. This extraneous matter, when coated on the blades of fans, detracts from the effective operation of the fan, and

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this means that the fan is not satisfactory or effective in causing hot air to issue out of the outlets. Further, as indicated hereinbefore, the accumulation of such dirt and extraneous matter raises a fire risk insofar as the heating means of hot air dryers are concerned. Usually, hot air dryers have a heating means between the inlet and the outlet, the fan causing the air to be drawn into the housing and thereafter to pass over heating means and out through the outlet. Thus, the accumulation of such dirt and extraneous matter could well come into contact with the heating means, to be ignited, and thereby cause fire. This is particularly undesirable danger insofar as hot air dryers are concerned.

BEST MODE OF CARRYING OUT THE INVENTION

The present invention provides a straightforward and efficient answer to this problem, in providing filtering means so that air being drawn through the inlet is filtered and this avoids or at least minimises substantially the amount of dirt or extraneous matter passing into the housing of the hot air dryer. Thus the disadvantages and dangers referred to above are overcome or substantially minimised. In one embodiment of the invention the filtering means would be provided over and inwardly of the inlet.

Referring now to Figure 1 of the accompanying drawings, this shows a hot air dryer in the form of a hamburger, such as might be used in a hamburger restaurant. The hot air dryer 1 has an air inlet on the underside thereof and an air outlet 2. Actuating means are also provided, in this case a button 3. The hot air dryer 1 in the form of a hamburger is formed by moulding from a vitreous earthenware material.

Referring to Figure 2 of the accompanying drawings a housing 4 is provided having an inlet 5 in the lower side thereof and an outlet 6. The inlet 5 leads into a fan chamber 7 in which is mounted an appropriate fan 8 which is in turn connected

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to, so as to be driven by, a prime mover 9 such as in the form of an electric motor. The housing 4 is connected to a source of power. Actuating means such as the button 3 of Figure 1 (not shown in Figure 2) are connected to the electric motor 9 so that on actuation thereof, the fan 8 will be caused to rotate. This then draws air in through the inlet 5 and through duct 10 to the outlet 6, where the air issues from the housing 4. Within the duct 10, or otherwise suitably positioned between the inlet 5 and outlet 6, air heating means such as heating elements connected to a supply of power are provided, these being indicated at 11 in Figure 2 of the accompanying drawings. In use therefore, air is drawn through the inlet 5 by the fan 8 through the duct 10 and over or through 6 as heated air, for use in drying hands, hair, body or the like.

While the invention has been described with reference to a manually operable actuating means 3, automatic operating means can be provided if desired, for example, infra-red actuating means.

In the form of the invention shown in Figure 2 of the drawings, appropriate mountings 12 are provided on each side of the inlet 5, immediately inwardly thereof, and are adapted to replaceably locate an appropriate filter 13, such as a filter pad or panel, so that filter 13 will extend across and over the inlet 5. In one form of the invention the mountings 12 are substantially "u" shaped in formation to allow for the filter 13 to be easily removed and replaced, such as for repair, cleaning and the like. The filter can be of any known formation or manufacture, but should extend across the inlet 5, inwardly thereof and within mouth of fan Chamber 7, so that air being drawn in through the inlet 5 will pass through the filter 13 and be filtered prior to coming into contact with the blades of the fan 8.

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It has been found that the positioning of the filter in this manner, and the filtering of air passing into the housing 4, overcomes or minimises the problems as outlined above.

In the present invention a dryer can be free standing, or provided with or attached to appropriate brackets, mountings or the like, to allow it to be suitably mounted on a desired surface, such as a wall or the like. This is by way of example only.

It should be appreciated that modifications and improvements may be made to this invention without departing from the scope or spirit thereof.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A hot air dryer comprising a housing formed from mouldable, vitreous earthenware material and having an air inlet and an air outlet; means within said housing to draw ambient air into the said housing and thereafter direct said air towards said outlet; heating means within said housing to heat air issues from the said outlet; and means to actuate the said means for drawing air into and through said housing.
2. The hot air dryer as claimed in Claim 1, wherein the mouldable, vitreous earthenware material is selected from the group consisting of porcelain, pottery and china.
3. The hot air dryer as claimed in Claim 1 and Claim 2, wherein the mouldable, vitreous earthenware materials, is in combination with a polymer to form a composite.
4. A hot air dryer comprising a housing formed from mouldable material and having an air inlet and an air outlet; means within said housing to draw ambient air into the said housing and thereafter direct said air towards said outlet; heating means within said housing to heat air as it passes to said outlet; and means to actuate the said means for drawing air into and through said housing; and filter means so as to filter ambient air passing into said housing.
5. The hot air dryer as claimed in Claim 4, wherein said filter means is disposed adjacent said air inlet and inwardly thereof.

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6. The hot air dryer as claimed in Claims 4 and 5, wherein the mouldable material is a vitreous earthenware material.
7. The hot air dryer as claimed in any of the proceeding claims, wherein said air inlet is in the underside of said housing.
8. The hot air dryer as claimed in any of the preceding claims wherein said means for drawing air into and through said housing is an electric fan accommodated within a fan chamber, said fan chamber communicating with said air outlet via a duct.
9. The hot air dryer as claimed in any one of the preceding claims, wherein said heating means is at least one electric heating element.
10. The hot air dryer as claimed in any one of the preceding claims, wherein said heating means is disposed between said air inlet and said air outlet.
11. The hot air dryer as claimed in any one of Claims 8 to 10 wherein said heating means is disposed within said duct.
12. The hot air dryer as claimed in any one of the preceding claims, wherein said actuating means is a push-button manually operable to simultaneously switch on said means for drawing air into and through said housing and said heating means.
13. The hot air dryer as claimed in any one of Claims 1 to 11 wherein the said actuating means is an infra-red device which is actuatable, to simultaneously switch on said means for drawing air into and through said housing and said

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heating means, upon a portion of a user's body passing through an infra-red beam emitted by said device.

14. The hot air dryer as claimed in any one of Claims 4 to 13 wherein said filter means is removably and replaceably located in mounting means associated with said air inlet and immediately inwardly thereof, so that filter means extends across said air inlet.
15. The hot air dryer as claimed in Claim 14, wherein said mounting means is comprised of a spaced-apart pair of channel-sectioned members, channel-section disposed one either side of said air inlet so that the openings of said members face each other, sides of a filter pad or filter panel being able to be fitted there into.
16. The hot air dryer as claimed in any one of the preceding claims, wherein said housing has a shape which simulates that of an object other than a hot air dryer.
17. The hot air dryer as claimed in any one of the preceding claims wherein the housing is adapted to receive and display promotional means.
18. The hot air dryer as claimed in Claim 17, wherein the promotional means includes printed matter.
19. The hot air dryer as claimed in Claim 17, wherein the promotional means includes a light emitting diode or crystal.
20. The hot air dryer as claimed in Claim 17, wherein the promotional means includes an audible message.

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21. The hot air dryer as claimed in Claim 17, wherein the promotional means includes a take away card or flyer.
22. The hot air dryer as claimed in any one of the preceding claims, wherein the said dryer is either free-standing or attachable to a wall or the like.
23. A hot air dryer, substantially as hereinbefore described with reference to the accompanying drawings.

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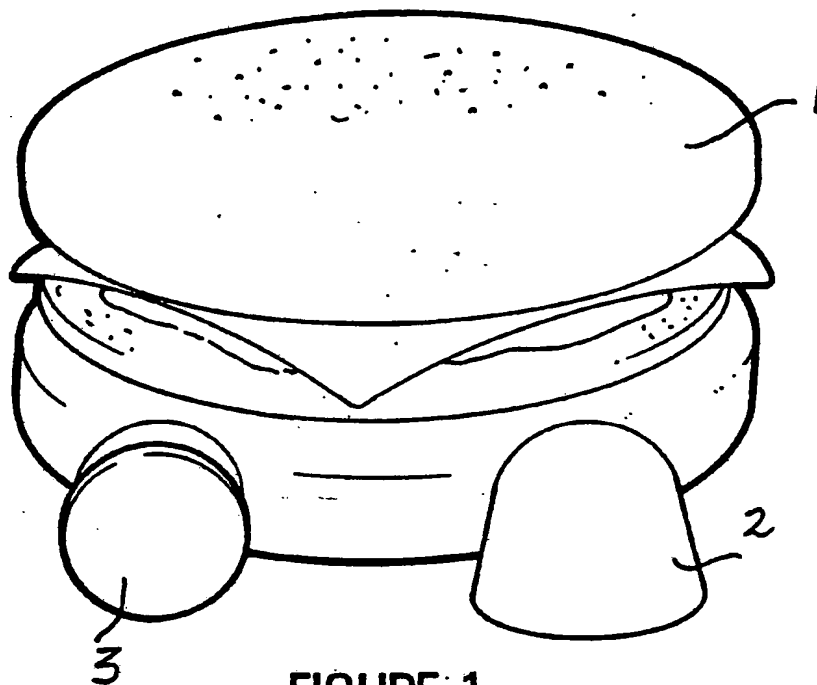


FIGURE 1

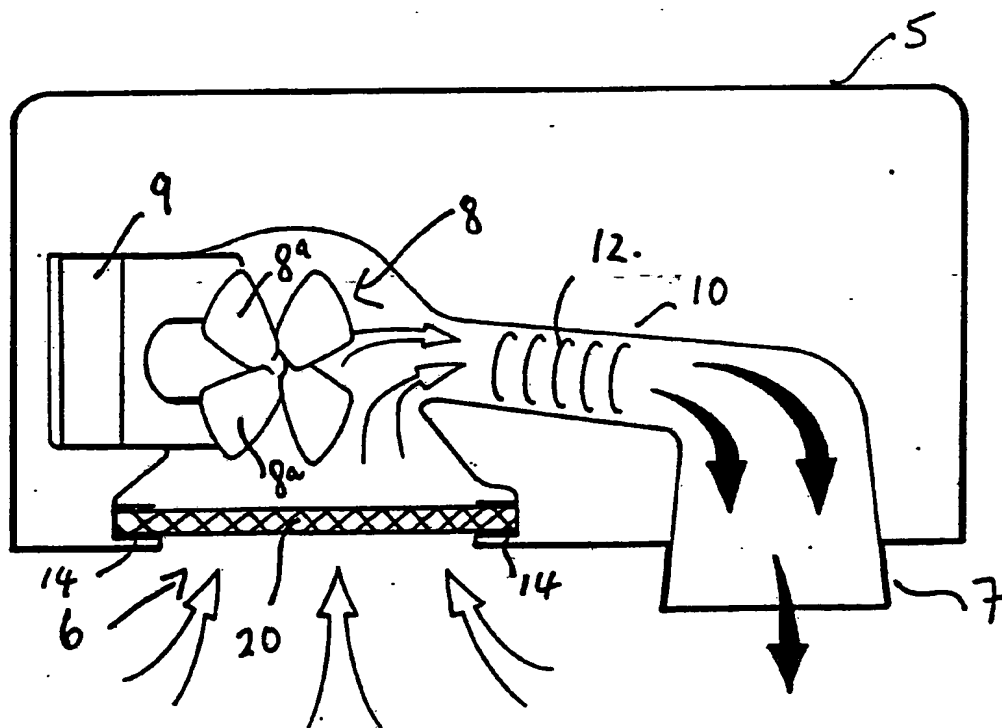



FIGURE 2

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INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 89/00320

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ⁴ A47K 10/48		
II. FIELDS SEARCHED		
Minimum Documentation Searched 7		
Classification System	Classification Symbols	
IPC	A47K 10/48	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched 8		
AU : IPC as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT 9		
Category*	Citation of Document, with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
X	FR,A,2534399 (DE RUYTER) 13 April 1984 (13.04.84)	(1,8-12, 17,22)
X	FR,A,2569029 (REVEIL) 14 February 1986 (14.02.86)	(1,8-12,17,18,22)
X	US,A,2634514 (CLEMENS) 14 April 1953 (14.04.53)	(1,8-12,17,22)
X	GB,A,2144325 (ANDA LIMITED) 6 March 1985 (06.03.85)	(1,4,5,8-14,22)
X	GB,A,2078511 (SMITHS INDUSTRIES LIMITED) 13 January 1982 (13.01.82)	(1,8-11,13,22)
X	US,A,2677041 (OLIVER et al) 27 April 1954 (27.04.54)	(1,8-12,22)
(continued...)		
<p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"G" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
10 November 1989 (10.11.1989)	20 November 1989	
International Searching Authority	Signature of Authorized Officer	
Australian Patent Office	D. KERTRAM 	

International Application No. PCT/AU 89/00320

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

X	GB,A,955277 (SIEMENS-ELECTROGELATE A6) 15 April 1964 (15.04.64)	(1, 8-12,22)
Y	AU,B,66114/86 (584261) (J.D. MACDONALD ENGINEERING COMPANY PTY LTD) 11 June 1987 (11.06.87)	(1,8-11,13,22) (1,8-11,13,22)

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim numbers , because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers , because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a):

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.
☐ No protest accompanied the payment of additional search fees.

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